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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/735,009	12/12/2000	Charles E. Boardman	24-BR-6010	3389

7590 10/23/2003

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EXAMINER	
PALABRICA, RICARDO J	

ART UNIT	PAPER NUMBER
3641	

DATE MAILED: 10/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/735,009	BOARDMAN ET AL.	
	Examiner	Art Unit	
	Rick Palabrica	3641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 August 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) *12-24,34 and 35* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 25-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. Applicant's Request for Continued Examination in Paper No. 18 and Amendment After Final Office Action in Paper No. 16, are acknowledged. The amendment, which is in response to Final Office Action dated 5/22/03, directly revises claims 1, 6, 7, 25, 28 and 29.

2. Claims 1 and 25 have been amended to each include the limitation, "said secondary heat loop and said recirculated heat transfer medium being separate from said high temperature water cracking system." Underlining provided. The examiner agrees that the now recited separation feature defines the claimed invention over the applied art of Koutz (U.S. 4,576,783) in combination with either one of Interrante et al. (U.S. 3,821, 358) or Wentorf, Jr. (U.S. 3,842,164).

However, the amended claims still do not define over prior art, as discussed below. Kapich (U.S. 4,413,348), who has a system similar to Koutz, discloses the claimed separation between the components cited by the applicant.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-11 and 25-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kapich (U.S. 4,413,348) in view of either one of Interrante et al. (U.S. 3,821,358) or Wentorf, Jr. (U.S. 3,842,164). Kapich discloses the applicant's claims except for the use of a liquid metal reactor and a gas heater to raise the temperature of the feed water heated by a liquid metal reactor, or the inclusion of a desalination plant in the system.

Kapich discloses the same inventive concept as the applicant of augmenting the temperature of a working fluid heated by a nuclear reactor to provide a temperature necessary to produce hydrogen by thermal chemical water splitting (see column 1, lines 32+). Kapich discloses a figure showing a high temperature gas cooled reactor with a reactor core (12) that heats the radioactive, primary coolant to approximately 1350°F. Kapich also discloses steam turbines (44, 50) that individually drive electric generators (45, 50).

Applicant's claim language reads on Kapich's invention as follows: a) "non-radioactive secondary loop comprising a recirculated heat transfer medium" reads on the secondary loop 42b comprising steam turbine 50, heat exchanger 56 and pump 58 (note that this secondary loop is a closed loop); b) "steam generator" reads on heat exchanger 58; c) "feed water" reads on the feed water supply 72 (note that the steam generator 58 is capable of raising the feed water temperature); d) "high temperature water cracking system" reads on reformer 36 (note that the feed water that has been converted to process steam is coupled to this reformer by the feed water input line; steam still contains water); e) "topping heater" reads on element 68 (note that this

element raises the temperature of the water-containing process steam); and f) "first regenerative heat exchanger" reads on heat exchanger 70.

Note that the secondary heat loop 42b and its recirculated heat transfer medium are separate from the high temperature water cracking system in loop 34. Note also that the feed water input line is in flow communication with the steam generator, the topping heater, and high temperature water cracking system. Also, note that the feed water and feed gas in loop 34 generates hydrogen through the reformer (see column 3, lines 62+).

Either one of Interrante et al. or Wentorf, Jr. teach the use of either a high temperature gas reactor or a liquid metal reactor as a heat source for thermochemical production of hydrogen and oxygen (e.g. see column 2, lines 28+ in Interrante et al. or column 2 lines 45+ in Wentorf, Jr.). One having ordinary skill in the art would have recognized that the primary and secondary references are in the same field of endeavor, i.e., hydrogen production using nuclear heat. Therefore, the teaching of either one of the secondary references can be applied to the primary reference. One having ordinary skill in the art would have recognized that substituting a liquid metal reactor as primary heat source for the gas-cooled of Kapich would have been prima facie obvious.

The claims are replete with statements that are either essentially method limitations or statements of intended or desired use, e.g., "capable of raising the temperature of said feed water between about 450°C to about 550°C", etc. These clauses, as well as other statements of intended use do not serve to patently distinguish the claimed structure over that of the reference, as long as the structure of the cited references is capable of performing the intended use. See MPEP 2111-2115.

See also MPEP 2114 that states:

> A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647.
>
> Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Danly*, 263 F.2d 844, 847, 120 USPQ 528, 531.
>
> [A]pparatus claims cover what a device is, not what a device does." *Hewlett-Packard Co. v. Bausch & Lomb Inc.*, 15 USPQ2d 1525,1528.

As set forth in MPEP 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim.

The system in the cited references is capable of being used in the same manner and for the intended or desired use as the claimed invention, e.g., by increasing the feed water temperature or operating the reactor at a higher power level..

As to the limitations regarding the gas-fired heaters, regenerative heat exchangers and gas desalination plant, which the examiner stated on page 5 of his 3/19/02 Office Action as well known in the art, said statement was not seasonably traversed by the applicant. Therefore, these objects of the well-known statement are taken to be admitted prior art. See MPEP 2144.03.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system, as disclosed by Kapich, by the teaching of either one of Interrante et al. or Wentorf, Jr., and admitted prior art, in order to have a system for generating hydrogen comprising feed water, liquid metal reactor,

steam generator, high temperature water cracking system, and gas topping heater, as this is no more that the use of well known techniques/design in the nuclear art, and the substitution of one system component by another well known system component.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 703-306-5756. The examiner can normally be reached on 7:00-4:30, Mon-Fri; 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Carone can be reached on 703-306-4198. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-1113.

RJP
October 21, 2003